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women of certain tribes, all of which belong to the Nu-Aruak stock. Tattooing is also limited to the ceramic tribes. The most perfect objects of their industry are the masks used in dancing. The Tupi tribes make them of painted fabrics; the others, of wood, with large noses and small openings for the eyes, ornamented with a symmetrical design of the face.

In general, only the men take part in the dances, ornamented with feathers, and with the body enveloped in cloaks of palm-fibre. The step is marked by the shaking of a rattle, and the dance is accompanied by songs containing ancient words, some of which are evidently unintelligible to the Indians themselves. The only other musical instrument is the flute of one or three tubes, and of all sizes, from very small ones up to those in which the larger tube is as high as a man. In the dances great use is made of bows and arrows, and, in the Tupi tribes, of a peculiar form of arrow, shot, not from a bow, but from a throwing-stick held in the hand. The dances are held within or in front of the feast-house, called the 'flute-house.' It is believed that any woman who should venture to enter this house would die. In other respects, however, the position of the woman is not so inferior as is generally supposed. Although her position may be that of a servant, she knows, like her civilized sisters, how to obtain a fair share in the government. They are devoted mothers, though the children are held to have more intimate relations with the father, from whom they are supposed to derive body and soul, than with the mother. Parentage, however, is traced through the mother. On the occasion of a birth, the father remains for several days in his hammock on a diet of water and porridge. Marriage is monogamous, and is effected by the bridegroom taking his chosen bride to his lodge and hanging his hammock over hers.

The dead are buried in front of the feast-house, with the head to the east, holes or canals being made to facilitate the entrance of ants and other insects. The belief in a continuation of life after death is general. In dreams the soul is believed to leave the body and wander in the places dreamed of; and it is recommended not to awaken a sleeper suddenly, for fear the time may not be given for the return of the soul. They have many legends of their ancestors, which pass from generation to generation, and appear to contain many antiquated words. The idea of a personal God is unknown. The *pagés* pretend to control the storms, and all cases of illness or death are attributed to them. They are also the physicians, the treatment consisting principally in blowing tobacco-smoke on the patient. The blowing of smoke in the ears of guests is also a sign of friendship, and the latter are invited to moisten the ears of their hearers with spittle in order to be more clearly understood. The *pagés* appear to enjoy as much respect as the chiefs. The authority of the latter, unless it be in war, is not great. Dissatisfaction with the government is expressed by a migration in a body from the village, leaving the government to itself.

The number of Indians on the Batovy and Kuliseu is estimated at more than three thousand. Before returning, the explorers distributed among them their stores, including over fourteen hundred knives, so that the future traveller in this region will no longer find the stone age.

ORVILLE A. DERBY.

Rio de Janeiro, July 26.

Proceedings of the Society for Psychical Research.

IN a notice of the Proceedings of the English Society for Psychical Research which appeared in *Science* for July 20, a sentence occurs which may, I think, mislead your readers on a rather important point. The writer refers to the statement in the Proceedings, that certain girls, from whom experimental evidence of telepathy had been gained, were afterwards detected in the use of a code of signals; and he goes on to say, "If scientific observers can thus be deceived by young girls, . . . ought not this to impress upon every investigator the profound importance of acquainting himself with the possibilities of deception?" Your readers will probably infer from this that the experiments in which signalling was detected were carried on under conditions which the investigators in question had erroneously regarded as excluding the possibility of deception. This inference, however, would be altogether mistaken: the view which the investigators took of these experi-

ments was that expressed in 'Phantasms of the living' (chap. ii. p. 22), as regards earlier experiments of the same kind.

"Still such simple objects would not demand an elaborate code for their description; nor were any effective means taken to block the percipient's channels of sense. . . . We could not, therefore, regard the testimony of the investigators present as adding much weight to the experiments in which any members of the family were among the group of agents, unless the percipient was completely isolated from that group."

As is explained in the passage of the Proceedings to which your reviewer refers, the experiments in which signalling was detected were merely interludes among other experiments conducted under more stringent conditions, which were complete failures.

FREDERIC W. H. MYERS.

Cambridge, Eng., Aug. 24.

Effigy Mounds in Northern Illinois.

THAT imitative or 'effigy' mounds are to be found in northern and north-western Illinois has been asserted from time to time in works treating of the remains of the mound-builders; but no one seems hitherto to have gone to any great trouble to prove the fact, much less to accurately survey, map, and publish specimens of them—at least, not so far as I have been able to find out.

Mr. Lapham, in his well-known work 'Antiquities of Wisconsin' (1855), mentions mounds of the 'turtle' form on Rock River as far south as Rockford, and others on Apple River in Illinois, a few miles south of the State line of Wisconsin.

In the fifth volume of the 'Geological Survey of Illinois,' A. H. Worthen, director (1873), especial mention is made of ancient mounds at Rockford and in its vicinity, particularly the one known as the 'Turtle Mound.' He says it resembles an alligator with its head cut off more than it does a turtle.

The above is all the information I have been able to find in print on the subject, though possibly there may have been minor articles in newspapers or other periodicals, now as completely lost as the proverbial needle in the haystack.

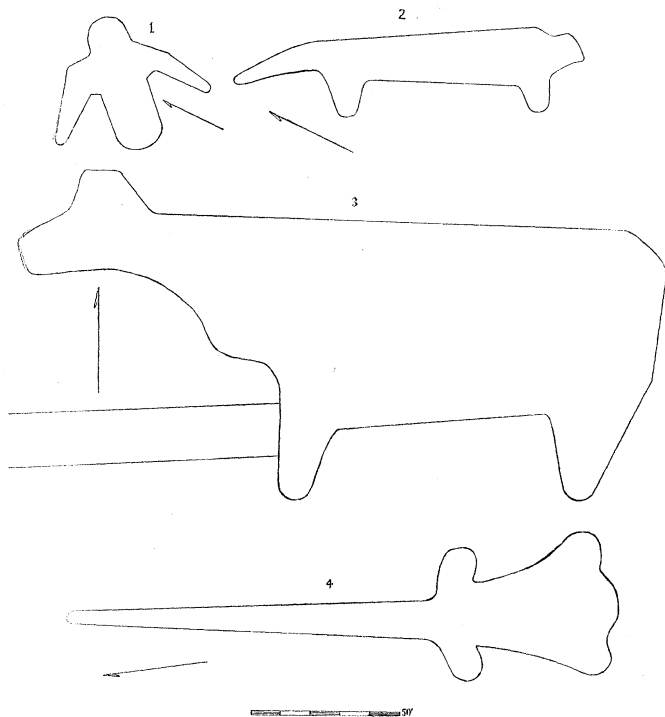
In a tour I made this spring in the region treated of, I looked for mounds of this class, and found them scattered at intervals along the Rock River valley, and also at points to the westward. I surveyed some of the best preserved of them, and here give succinct descriptions of four, which all differ from each other in shape, with necessary illustrative diagrams exactly drawn to scale from my field-notes.

The so-called 'Rockford Turtle' (1) in Winnebago County is situated between Main Street and Rock River, four blocks north of State Street, in the city of Rockford. It is 184½ feet long from the tip of its tail to the centre of the farther end, where a head should be, according to our ideas. It is three feet high at the junction of the hind-legs with the body, at the junction of the fore-legs and body the average height is 4 feet, but from the bottom of a slight swale that passes the head the height is 5½ feet. In connection with this effigy there is a bird (with one wing demolished), seven round mounds, and two embankments. These mounds are located on the most beautiful spot in the city, and, with one exception, have been well preserved by the owners of the land.

The bird-effigy (2) is on the east side of Rock River, some five miles below Rockford, on the N.W. ¼ of Sec. 14, T. 43, R. 1, E., in Winnebago County also. Its length from top of head to end of tail is 45½ feet; and from tip to tip of wings, following the centres, it is 68 feet. The height at the junction of the wings and body is 2 feet. While this is unquestionably intended to represent a bird, yet it is impossible to give it a closer classification. With it there are three embankments and two round mounds. The group is situated on a high bank some 45 feet above the river, and commands a fine view.

The animal (3) is on the N.W. ¼ of Sec. 22, T. 26, R. 2, E., some two miles below the village of Hanover, in Jo Daviess County, and on the east side of Apple River. Its greatest length in an air line is 216 feet, and the average height of the body 5½ feet. The body and head are on nearly level ground, while the legs run down the slope. The fore-leg rests on the end of an embankment which is 170 feet long and 1 foot high. From the general appearance at the

connecting point, it is very evident that the animal was constructed last. This overlapping of mounds is by no means uncommon in the North-West, and probably may account for the 'amalgamation mounds' of some writers. Besides the animal, there are in the same group twenty-three round mounds and ten embankments, as well as four other round mounds which have 'approaches,' or a low embankment, running from each.



A much less bulky animal (4) is on the S.E. $\frac{1}{4}$ of Sec. 13, T. 27, R. 9, E., some ten miles east of Freeport, Stephenson County, and on the north side of Pecatonica River. Its greatest length in an air line is 116 $\frac{1}{2}$ feet, and the average height of the body 1 $\frac{1}{4}$ feet. In the same group with it there is one embankment and seven round mounds, three of which are partially demolished. In one of the latter a fine hematite 'plumb-bob' was unearthed, in connection with a human skeleton which was badly decayed. Hematite relics in this region, and especially plumb-bobs, are exceedingly rare.

Near these mounds, but at the foot of the slope, there is a fine boiling spring of pure cold water.

Very few of these Illinois effigy mounds are in a good state of preservation; but I looked around long enough to find ten of them worth surveying, of which the four now given are the best suited for publication as types.

In surveying mounds of this class it has been a special object to get their true outlines as near as possible, without any preconceived ideas or fanciful imaginings as to what animal or other object they were intended to represent. To do this it is necessary to determine where the artificial ground ends on the natural surface. It is hardly possible, however, for the reader, even with the aid of faithful diagrams, to form an adequate idea of the beauty and symmetry of the effigies as they appear to the eye when in their undisturbed state.

T. H. LEWIS.

St. Paul, Minn., July 31.

The Coal-Measures of Kansas.

THE drilling of a 2,000-foot well at Emporia, Kan., has furnished an excellent section of the coal-measures of this State. The location of the section, unfortunately, can be given but approximately. Beginning somewhere in the upper half of the upper coal-measures, it ends in the lower third of the lower coal-measures. The section is very interesting, however, independently of its position in the formations.

In the depth of nearly 2,000 feet there are 112 strata with an average thickness of nearly 18 feet. Of these strata, 50 are shale,

50 limestone, and 12 sandstone. The limestone strata average 9 $\frac{1}{4}$ feet in thickness; the shale, 25 feet; and the sandstone, 24 feet. In the upper thousand feet are $\frac{4}{5}$ of the shale strata, $\frac{1}{5}$ of the limestone, and $\frac{5}{12}$ of the sandstone strata; but in the first thousand feet are $\frac{7}{12}$ of the shale, nearly $\frac{1}{2}$ of the limestone, and $\frac{1}{7}$ of the sandstone. The total thickness of the shale is 1,242 feet, limestone 465 feet, and sandstone 286 feet. Mingled with the shale are three beds of coal in the first 500 feet, and one bed in the last 500. The thicknesses average less than one foot.

The section teaches that the conditions under which the coal-measures were deposited were exceedingly variable, and that the tracing of the strata through eastern Kansas will not be a holiday task.

These deposits, even including the limestone, are mostly shallow-water accumulations, and are quite rich in fossils, especially the limestone. Incrusting corals, crinoid joints, and brachiopod and conchifer shells are especially abundant. Trilobites are rare.

L. C. WOOSTER.

Eureka, Kan., Aug. 31.

Radiant Energy.

IN your issue, Aug. 17, Prof. S. P. Langley, in his presidential address at the late meeting of the American Association for the Advancement of Science, puts his case a little too strongly in favor of Draper, I think, when referring to Melloni's statement of the relation between light and heat forms of radiant energy, made in 1843. He says, —

"So far as I know, no physicist of eminence re-asserted Melloni's principle till J. W. Draper, in 1872. Only sixteen years ago, or in 1872, it was almost universally believed that there were three different entities in the spectrum, represented by actinic, luminous, and thermal rays."

As a student at Dalhousie University, Halifax, Nova Scotia, before Draper's publication of 1872, I found Melloni's principle not only "re-asserted," but accepted. I fail to understand how it could be otherwise in the United States, when Tyndall's lectures and demonstrations in the Royal Institution were published in 1863, a quarter of a century ago; when the Smithsonian Report of 1868, twenty years ago, published Tyndall's Rede Lecture before the University of Cambridge in 1865, with translations of articles by Cazin and Magrini bearing on the same subject. But, more than that, Tyndall's lectures were published in a neat volume of some five or six hundred pages, by D. Appleton & Co. of New York, in 1870, two years before Draper's publication. I thought Professor Langley might have eminent "American physicists" in his mind; but his reference to the English cyclopædia of 1867 immediately before, suggests no such limit to his statement.

A. H. MACKAY.

Pictou Academy, Nova Scotia, Aug. 22.

[Mr. MacKay's letter may elicit more information on an interesting point, but attention should be drawn to the fact that he offers no evidence (i.e., cites no passages) to show that the lectures he mentions *do* quote any "physicist of eminence" in plain support of the doctrine in question. A statement as explicit as Melloni's or Draper's is what is wanted. Statements which might mean this (or any thing else) are plenty. —ED.]

The Laws of Corrasion.

UPON opening my copy of *Science* this morning, I am greeted with your note on Major Powell's "first formal announcement of a new law in the hydraulics of rivers" upon the relation between their corradng power and sedimentary load. I think you will find this principle fully stated by Major Powell in his 'Report on the Geology of the Uinta Mountains' (Government Printing-Office, 1876); but my object in writing is to draw your attention to the recognition of this "new law" in Chapter XVI., and especially p. 226, of the new 'Physical Geography' of Van Antwerp, Bragg, & Co. The law as enunciated in the first paragraph of *Science* (No. 290) is only true within certain limits, for the sedimentary load of a stream may become so great that it requires all the energy of the current to simply transport it, and hence there is little or no corrasion. The rivers of the Great Plains, — as Platte, Republican, Arkansas,